Toward non-human-centered design: designing an academic article with ChatGPT

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Abstract
Non-human-centered design tools, such as ChatGPT, have shown potential as effective aids in academic article design. This study conducts a comparative evaluation of ChatGPT-3.5 and ChatGPT-4, examining their capabilities and limitations in supporting the academic article design process. The study aims to demonstrate the utility of ChatGPT as a writing tool and investigate its applicability and efficacy in the context of academic paper design. The author interacted with both versions of ChatGPT, providing prompts and analyzing the generated responses. In addition, a different expert academic was consulted to assess the appropriateness of the ChatGPT responses. The findings suggest that ChatGPT, despite its limitations, could serve as a useful tool for academic writing, particularly in the design of academic articles. Despite the limitations of both GPT-3.5 and GPT-4, GPT-3.5 offers a broader perspective, whereas GPT-4 provides a more in-depth and detailed approach to the design of articles. ChatGPT exhibits capabilities in aiding the design process, generating ideas aligned with the overall purpose and focus of the paper, producing consistent and contextually relevant responses to various natural language inputs, partially assisting in literature reviews, supporting paper design in terms of both content and format, and providing reasonable editing and proofreading for articles. However, limitations were identified, including reduced critical thinking, potential for plagiarism, risk of misinformation, lack of originality and innovation, and limited access to literature.

Keywords
Artificial intelligence; AI; Academic texts; Scientific articles; AI implementation; AI perspectives; Article design; Artificial intelligence in education; Assessment; ChatGPT; Conversational AI; GPT-3.5; GPT-4; Human-AI collaboration; Machine learning; Natural language processing (NLP); Learning; Teaching.

1. Introduction
The decision-making process in innovation processes is rooted in how people generate ideas and solve problems, which scholars and practitioners refer to as "design". However, advances in artificial intelligence (AI) technology may transform this process into one that is entirely or partially taken over by machines rather than humans (Liedtka, 2015; Verganti; Vendraminelli; Iansiti, 2020). Research in this area suggests that AI has changed the design perspective and further strengthened the principles of design thinking (Liedtka, 2015; Verganti; Vendraminelli; Iansiti, 2020).

AI-supported tools enable various design activities such as empathy, interpretation, idea generation, prototyping, and testing, allowing for the exploration of the various roles intelligent and fully dialogue-based agents can play in the design process (Dellermann et al., 2021; Verganti; Vendraminelli; Iansiti, 2020; Wang et al., 2020). Discussions on the role of these
technologies in the design process continue with advancements showing that machine learning systems excel at the tasks they are trained on (Amodei et al., 2016; Radford et al., 2019). As AI is inherently a decision-making technology, it presents opportunities for automation in tasks related to learning and generating solutions (Verganti; Vendraminelli; Iansiti, 2020).

Academic articles are one of the most important platforms for publishing scientific discoveries and research. Therefore, article design is extremely important in the presentation of scientific studies, and the quality of the design is a determining factor in the effectiveness and impact of the study. When designing an article, proper structuring, appropriate language use, and a layout that readers can easily understand are crucial.

The design of academic articles is a complex process that requires careful planning, organization, and writing skills. However, the academic research field and the methods and tools used are constantly evolving. Traditionally, a human-centered design approach is primarily used in article design. However, the number and sophistication of artificial intelligence technologies that help improve the preparation and quality of articles are rapidly increasing (Flanagan et al., 2023). The rapid development of artificial intelligence technologies is making it increasingly possible to use non-human-centered design methods in the academic world, such as those using language models like ChatGPT. This situation is increasing the importance of the non-human-centered design approach.

ChatGPT is a language model developed by OpenAI that utilizes machine learning algorithms to generate human-like text. ChatGPT is the latest example of artificial intelligence that can produce “human-like” text by processing large amounts of text from the internet, also known as Large Language Models (LLMs) (OpenAI, 2022; O’Connor; ChatGPT, 2022; Rettberg, 2022). As it has been trained with vast amounts of data, ChatGPT is capable of simulating human conversations by comprehending the context (Borji, 2023). After being publicly released on November 30, 2022, ChatGPT-3.5 attracted more than a million users and received significant media coverage in just one week (Altman, 2022; Roose, 2022; Lock, 2022), demonstrating that it is one of the most exciting developments in the field of artificial intelligence (Aljanabi, 2023). Then, while OpenAI has pledged to continue offering a free version of ChatGPT, it also unveiled a subscription option (currently available for $20 per month) that offers users faster access to new versions of the application and better reliability (Sabaileva; Valentini, 2023). OpenAI released the paid version, known as ChatGPT-4, on March 14, 2023.

This article explores the potential of ChatGPT in designing academic papers. ChatGPT is used for various purposes in the academic field, including language translation, document summarization, inference, question-answering systems, and language modeling (OpenAI, 2022). Therefore, this study aims to investigate the effectiveness and suitability of ChatGPT-3.5 and ChatGPT-4 in the context of academic article design and compare how they can be used as writing assistance tools. The contribution of ChatGPT to paper design will include various dimensions such as improving collaboration and authorship processes, effective use in writing assistance, editing, and proofreading. The overall aim of the article is to provide recommendations for the use of language models such as ChatGPT in academic paper design and discuss the impact of non-human-centered design approaches on academic writing processes. The results of this study will serve as a basis for future research by discussing the potential benefits and limitations of using artificial intelligence technologies and non-human-centered design approaches.

2. Using ChatGPT for academic article design

Artificial intelligence technologies have rapidly developed in recent years and are widely used in many fields. ChatGPT, a natural language processing tool, has emerged as a prominent tool in scientific and healthcare publications. In January 2023, the journal Nature announced the publication of two preprints and two articles that include ChatGPT as an “Artificial” author (Stokel-Walker, 2023). The Nurse Education in Practice editorial (O’Connor; ChatGPT, 2023) stated that only three conditions need to be met in the editorial policy. However, ChatGPT cannot meet the fourth article of the International Committee of Medical Journal Editors (ICMJE) editorial on accountability because it fails to respond on an emotional reasoning and moral basis, or to assume the ethical and legal duties that come with this article (Stokel-Walker, 2023). Teixeira-da-Silva (2021; 2023) even argues that ChatGPT does not meet any of the four ICMJE criteria for authorship. Some publishers also point out that authorship implies responsibilities and tasks that can only be attributed to and performed by humans. Therefore, it is emphasized that publishing policies should not list AI and AI-enabled technologies as authors or co-authors (e.g., Elsevier, 2023). This makes the authorship of the O’Connor and ChatGPT (2023) editorial controversial (Stokel-Walker, 2023; Teixeira-da-Silva, 2023). On the other hand, according to Polonsky and Rotman (2023), as AI develops and gets stronger, it will eventually be able to meet the ICMJE authorship requirements and work with humans to produce academic publications. Some scientific studies have even used information provided by ChatGPT as scientific knowledge (Mijwil, Aljanabi; ChatGPT, 2023; Mijwil et al., 2023). However, the widespread use of large-scale language models and similar technologies raises uncertainties about the future of certain professions related to content creation. Some experts believe that professions such as programmers, professors, game writers, and journalists could be replaced by artificial intelligence (Lock, 2022). Therefore, more research is needed to understand the effects of artificial intelligence technologies, and they need to be adapted to the job market and education sectors. ChatGPT is trained on various text data, such as books, articles, and online conversations, and provides accurate information on a wide range of topics (Susnjak, 2022). Therefore, the benefits that ChatGPT brings to the academic world are extensive. For example, researchers can process large amounts of data more efficiently and effectively, create realistic scenarios to test and evaluate theories, and communicate their findings in a clear and concise manner. These capabilities
have the potential to significantly advance research in various fields and provide new discoveries and insights that could transform our understanding of the world (Alshater, 2022).

ChatGPT has been trained to provide assistance in the academic world by giving feedback on writing skills, consistency, grammar, extracting key points, and providing citations, thus enhancing academic writing abilities (Aljanabi et al., 2023; Aydin; Karaarslan, 2022; Gilat; Cole, 2023; Golan et al., 2023; Huang; Tan, 2023). Furthermore, analyses of ChatGPT’s abilities and limitations suggest it has significant potential to improve academic research, particularly in fields such as economics and finance (Alshater, 2022).

ChatGPT is increasingly being used by researchers as an “assisted-driving” approach that promises to free up their time from scientific writing burdens and return them to science (Hutson, 2022). This can help researchers focus on more critical activities, such as analysis and interpretation, thereby increasing their productivity (Bašić et al., 2023). Additionally, the use of ChatGPT has the potential to offer a range of benefits, such as participation, collaboration, and accessibility (Cotton; Cotton; Shipway, 2023). Researchers may also use ChatGPT to familiarize themselves with new topics and double-check the completeness of literature reviews (Hutson, 2022; Lund; Wang, 2023).

On the other hand, the use of ChatGPT in education raises ethical concerns (Alshater, 2022; Anderson et al., 2023; Lin, 2023; Lund et al., 2023; Williamson; Magilchrist; Potter, 2023; Sullivan; Kelly; McLaughlan, 2023). There are concerns that the use of ChatGPT may lead to a decrease in academic integrity (Ouyang; Zheng; Jiao, 2022; Perkinds, 2023; Sullivan; Kelly; McLaughlan, 2023). The potential for misuse of ChatGPT and issues of originality in scientific studies are also on the agenda. Stokel-Walker (2023) has expressed concerns about the misuse of ChatGPT. Recently, the International Conference on Machine Learning (ICML) banned the use of large-scale language models to generate article text because ChatGPT can lead to originality issues in scientific texts (Srivastava, 2023). Grimaldi and Ehrler (2023) have noted questions about whether scientific texts generated by ChatGPT are original and who the content’s intellectual owner is. The impact of ChatGPT on academic article writing is even more concerning. In a recent study, abstracts generated by ChatGPT were only caught by academic reviewers at a rate of 63% (Thorp, 2023). Flanagin et al. (2023) warn that human responsibility and transparency are necessary for the reliable use of ChatGPT as a source of information.

Bishop (2023) and Kitamura (2023) argue that ChatGPT lacks critical thinking ability, while Nguyen (2023) notes that it lacks systematic reasoning skills. Alshater (2022) also emphasizes that ChatGPT has limitations in terms of generalizability, data quality, and domain expertise. Furthermore, Ma et al. (2023) has found that scientific texts generated by ChatGPT have a different “writing style” than those written by humans. Flanagin et al. (2023) have concluded that although ChatGPT’s text responses to questions are mostly well-written, they contain formulaic and outdated answers, lack correct or complete references, and even include fabricated, non-existent evidence. Additionally, a study by Bang et al. (2023) has found that ChatGPT is an unreliable reasoning tool, with an average accuracy rate of only 64.33% across 10 different categories of reasoning, including logical, non-textual, and commonsense reasoning.

Moreover, hallucination problems, specifically “reference hallucination,” and the lack of source attribution are among the frequently expressed concerns in the academic community about ChatGPT (Alkaisi; Mcfarlane, 2023; Ariyaratne et al., 2023; Bang et al., 2023; Ma et al., 2023; Williamson; Magilchrist; Potter, 2023). ChatGPT can produce convincing scientific summaries even with entirely generated data. However, such tools bring along a series of challenges and concerns, particularly regarding academic integrity and plagiarism (Cotton; Cotton; Shipway, 2023; Gao, 2022). Therefore, users need to be cautious and question the reliability and accuracy of ChatGPT’s responses, particularly regarding issues such as referencing in scientific texts. The use of third-party content in created manuscripts can also lead to copyright issues (Baeza-Yates, 2022). Another disadvantage is that ChatGPT currently lacks any form of regulation (Ouyang; Zheng; Jiao, 2022; Sabzalieva; Valentini, 2023) and raises concerns about privacy. ChatGPT only collects data from databases and texts it analyzes on the internet, so it also learns any cognitive biases present in this data. There are also two main concerns regarding the accessibility of ChatGPT. The first issue is limited accessibility in some countries due to laws and internet limitations, while the second is unequal internet access, which poses challenges in terms of equity and distribution of information and resources for AI teaching and research (Sabzalieva; Valentini, 2023). On the other hand, the power of ChatGPT to generate and disseminate content that reinforces stereotypes should not be overlooked (Caira; Russo; Aranda, 2023). However, when it comes to human-machine collaboration in article design using ChatGPT, the potential benefits outweigh the disadvantages, as Alshater (2022) has also noted.

3. Methodology

This study employs a case study approach utilizing ChatGPT, which has the potential to advance research. The process of designing an academic article using ChatGPT involves a series of conversations between the author and ChatGPT-3.5 and ChatGPT-4 through a chat interface. The author asks questions and presents ideas while ChatGPT-3.5 and ChatGPT-4 provide feedback and suggestions, and generates text based on the input. The methods include i) Providing prompts for the ChatGPT web application to write articles, focusing on ChatGPT’s role in academic article design; and ii) Analyzing ChatGPT’s responses for relevance. ChatGPT’s capabilities and limitations to support several design activities were examined across six project stages: 1) Implications of ChatGPT for article design; 2) Presentation of the general purpose and approach of the article; 3) Addressing the possible questions generated; 4) Identification of the literature review; 5) Creating writing assistance; and 6) Editing and proofreading.
The case study method, widely employed across various disciplines, especially in the social sciences, is a well-established research design (Crowe et al., 2011). According to Yin (2009), case studies can be used to clarify, describe, or investigate events or phenomena in typical situations. A case study involves an in-depth investigation of a person, a group of people, or a unit, with the intention of generalizing findings to other similar units. Case studies are valuable in understanding complex processes and involve collecting information about the situation(s) over a period. They are qualitative research methods that focus on the creation of themes (Gustafsson, 2017). The case study approach is effective in examining and highlighting comprehensive and significant aspects of real-life occurrences. Furthermore, researchers can benefit from the insights obtained through case studies, as they provide opportunities for careful analysis within specific contexts (Crowe et al., 2011; Fidel, 1984; Zainal, 2007). Moreover, case analysis is a flexible approach that supports exploratory inquiry, detailed description of specific experiences, and analytical generalization (Gilson, 2012). Limiting the number of cases in this study, as observed in many case analysis studies, allows researchers to allocate more time and delve deeper into the analysis of each individual case (Gustafsson, 2017). Consequently, case studies hold significant publication value as they serve as exemplars and tools for knowledge dissemination (Flanagan, 1999).

Case study authors are recommended to explicitly outline their theoretical framework and methodologies, as well as to seek and follow any relevant professional guidance (Wager; Kleinert, 2010). The answers produced by ChatGPT were reviewed by an expert academic at the six stages mentioned above and approved for accuracy, consistency, and academic appropriateness. This review resulted in agreement with the author and eliminated the need for additional revision or approval.

4. Results
This section provides a comprehensive account of the conversations between the author and ChatGPT-3.5 and ChatGPT-4 throughout the article design process. The process starts with the introduction of the main purpose and approach of the project.

4.1. Implications of ChatGPT for article design
In the first prompt, the author asks how ChatGPT-3.5 and ChatGPT-4 can be used to design articles. In this section, we evaluate the potential contribution of using ChatGPT in the academic writing process and the significance of design in this process.

Figure 1. Text on how to design an article in ChatGPT generated by ChatGPT-3.5 and ChatGPT-4
Both versions emphasize that ChatGPT can be a valuable tool for designing articles in academia by providing assistance, generating ideas, and aiding in the writing process. They both highlight the importance of using ChatGPT as a supportive tool rather than a replacement for the researcher’s own thinking and writing process. The steps mentioned for utilizing ChatGPT in designing articles include generating ideas, outlining the article, research assistance, drafting and refining, and proofreading and editing. They both acknowledge the need for critical evaluation and the importance of considering the limitations of an AI model. On the other hand, ChatGPT-4’s response includes an additional step called “Critical Evaluation”, which emphasizes the researcher’s role in critically evaluating ChatGPT’s suggestions, cross-referencing information with credible sources, and exercising judgment. ChatGPT-4’s response suggests engaging in a back-and-forth conversation with ChatGPT, asking for clarification or further elaboration on the generated ideas, while ChatGPT-3.5’s response focuses more on inputting specific queries. ChatGPT-4’s response mentions “Drafting and Refining” as a separate step, whereas ChatGPT-3.5’s response encompasses it within the general writing assistance section.

Overall, both versions highlight the value of ChatGPT in article design, provide guidance on utilizing its capabilities, and emphasize the importance of the researcher’s critical thinking and evaluation. ChatGPT-4’s response further emphasizes the need for critical evaluation and engaging in interactive conversations with ChatGPT.

4.2. Presentation of the general purpose and approach of the article

In the second prompt, the author first states the general purpose and focus of the article. The aim of this request is to test the pathway of idea generation.

Both responses effectively discuss the role of ChatGPT in academic article design and underscore its significance. Additionally, both responses aim to examine the implications of non-human-centered designs within the academic realm, addressing the advantages and challenges associated with ChatGPT utilization. Ethical considerations and limitations are also acknowledged in both responses. Furthermore, both responses advocate for human-centered approaches, highlighting their importance and offering recommendations. However, the ChatGPT-3.5 response adopts a broader perspec-
Active by presenting guiding questions to the article writer for selecting relevant and intriguing aspects. In contrast, the ChatGPT-4 response provides a more detailed overview and suggests techniques in the part titled “Striking a balance: Human-centered approaches” that emphasize human-centered methodologies and introduce the idea of “Critical evaluation” to critically evaluate AI recommendations. In conclusion, while both ChatGPT-3.5 and ChatGPT-4 replies address related topics, they reveal important structural differences, with ChatGPT-4 offering a more thorough description and placing a greater emphasis on critical review and human-centered approaches.

4.3. Addressing the possible questions generated

In the third prompt, the author asks ChatGPT to design an article based on some questions generated by ChatGPT (questions 1 and 5 of ChatGPT-3.5 under the heading “Presentation of the general purpose and approach of the article”). The purpose of this prompt is to test how ChatGPT would design an article based on the generated questions. For the second article, the author also makes additional requests to improve the article design, such as adding citations and references and evaluating the topics from both positive and negative perspectives.

The responses from ChatGPT-3.5 and ChatGPT-4 exhibit similarities and differences in both their structure and content. In terms of structure, both responses adhere to a standard format for academic papers. They consist of sections such as title, abstract, introduction, an overview of ChatGPT, the role of ChatGPT in academic article design, human-centered approaches, ethical considerations and limitations, critical evaluation (in the case of ChatGPT-4), and conclusion.

Both responses acknowledge the significance of ChatGPT in the design of academic articles and emphasize its role in the field. They share the objective of analyzing the impact of non-human-centered designs within the academic realm. Ad-

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**Figure 3. Article design text generated by ChatGPT-3.5 and ChatGPT-4**

**ChatGPT-3.5**

Title: ChatGPT: An Overview and Its Applications in Academic Paper Design

Abstract: The development of large language models has revolutionized the field of natural language processing. ChatGPT is one such model that has gained considerable attention due to its ability to generate coherent and contextually relevant responses to a wide range of natural language inputs. This paper provides an overview of ChatGPT and explores its potential applications in academic paper design.

Introduction: The emergence of large language models, such as GPT-3, has led to significant advancements in natural language processing. ChatGPT, a variant of GPT-3, is a conversational AI model trained on a vast corpus of text data. It has the ability to generate human-like responses to natural language inputs, making it a valuable tool for various applications, including academic paper design. This paper provides an overview of ChatGPT and examines its potential applications in academic paper design.

Background: ChatGPT is a large-scale transformer-based neural network model developed by OpenAI. It is pre-trained on a vast corpus of text data and fine-tuned for specific tasks, such as conversational AI, text completion, and text summarization. The model has 1.5 billion parameters and can generate contextually relevant responses to natural language inputs.

Applications of ChatGPT in Academic Paper Design: ChatGPT has several potential applications in academic paper design. One such application is in the generation of abstracts. Abstracts are concise summaries of research papers, typically containing 100-250 words. They provide readers with a brief overview of the research conducted, the methodology used, and the results obtained. Generating abstracts can be time-consuming, and the quality of abstracts can vary significantly. ChatGPT can be used to generate abstracts quickly and efficiently, ensuring that they are contextually relevant and coherent.

Another potential application of ChatGPT is in the writing of introductions. Introductions provide readers with an overview of the research conducted, the motivation behind the research, and the research questions. ChatGPT can be used to generate introductions that are concise and relevant, providing readers with an overview of the research topic and the research questions.

ChatGPT can also be used to generate literature reviews. Literature reviews are critical components of research papers that provide an overview of existing research on a particular topic. ChatGPT can be used to generate literature reviews quickly and efficiently, ensuring that the reviews are contextually relevant and comprehensive.

Conclusion: ChatGPT is a powerful language model that has several potential applications in academic paper design. It can be used to generate abstracts, introductions, and literature reviews quickly and efficiently, ensuring that these components of academic papers are contextually relevant and coherent. However, it is important to note that ChatGPT is a tool and should not replace the critical thinking and writing skills of researchers. Rather, it should be used to supplement and enhance their writing process.

**ChatGPT-4**

Title: ChatGPT in Academic Paper Design: Exploring the Role of AI Assistance in Enhancing Efficiency and Creativity

Abstract: This paper examines the emergence of ChatGPT, an AI language model, and its impact on academic paper design. It investigates the benefits and challenges of incorporating ChatGPT in the academic writing process, with a focus on its ability to generate ideas, provide research assistance, and aid in drafting and refining articles. Additionally, the ethical considerations and limitations associated with non-human-centered designs are discussed. The paper argues for a balanced approach that combines AI assistance with human expertise, critical thinking, and peer collaboration to ensure high-quality and human-centered academic writing.

Introduction: ChatGPT can be utilized to generate ideas and explore research directions. Examples showcasing the effectiveness of ChatGPT in inspiring novel perspectives and stimulating creativity.

3.2 Research Assistance

Exploration of ChatGPT’s role in assisting researchers in finding relevant sources, journals, and research papers.

Discussion of its potential in providing context, supporting evidence, and helping in data analysis.

3.3 Drafting and Refining

Analysis of ChatGPT’s contribution to the drafting process by providing suggestions for structure, flow, and content.

Examination of how ChatGPT can assist in improving language usage, grammar, and overall clarity of academic writing.

Ethical Considerations and Limitations 4.1 Ethical Considerations

Examination of ethical concerns related to authorship, plagiarism, and the need for proper attribution.

Discussion on the responsible use of ChatGPT to maintain academic integrity.

4.2 Limitations of ChatGPT

Analysis of the limitations of ChatGPT, including challenges in understanding context, detecting biases, and producing high-quality academic content.

Discussion on the importance of human oversight and critical evaluation.

Sticking to a Balance: Human-Centered Approaches

Proposal of strategies for integrating human-centered approaches alongside ChatGPT’s assistance.

Emphasis on the significance of human expertise, critical thinking, and peer collaboration in maintaining the integrity and quality of academic writing.

Conclusion

Summary of the key points discussed in the paper.

Reflection on the implications of ChatGPT’s role in academic paper design.

Call for further research and thoughtful exploration of the evolving relationship between AI assistance and human-centered academic writing.

Throughout the paper, examples, case studies, and scholarly references will be incorporated to support the arguments and provide a comprehensive analysis of ChatGPT’s role in academic paper design.
Toward non-human-centered design: designing an academic article with ChatGPT

Introduction: The emergence of non-human-centered designs, such as ChatGPT, in academic research has sparked a debate on their impact on the quality and ethics of academic writing. ChatGPT can enhance efficiency and accuracy in various aspects of academic research, offering a range of benefits. However, it also compromises ethical standards and breaches critical thinking. This paper aims to explore the positive and negative aspects of ChatGPT and its effects on academic research quality and validity.

Positive Aspects: ChatGPT is a natural language processing algorithm designed to produce contextually relevant responses to test inputs. Its ability to process large amounts of data and provide concise responses makes it an invaluable tool for academic writing. ChatGPT can be used to generate high-quality summaries, introductions, and literature reviews, which can save researchers time and resources. Furthermore, it can assist researchers in identifying patterns and trends in data, leading to new insights and discoveries.

Negative Aspects: Despite its positive contributions, ChatGPT has some negative aspects that must be considered. First, ChatGPT relies on algorithms to provide responses, and it may not provide original insights or alternative perspectives. Additionally, it fails to consider ethical implications and may not provide for important ethical considerations. Furthermore, ChatGPT can produce biased or inaccurate responses, especially when provided with biased or incomplete data.

Conclusion: In conclusion, ChatGPT and other non-human-centered designs have the potential to enhance the efficiency and accuracy of academic research. However, it is crucial to consider the potential negative aspects, including the risk of compromising ethical standards and breaching critical thinking. Future research should continue to explore the impact of ChatGPT on academic writing and develop strategies to mitigate its negative effects.

Can you write an academic paper on this topic? Does ChatGPT affect the quality and validity of academic research?

Figure 4. Article design text created by ChatGPT-3.5 and ChatGPT-4 with additional request.
contrast, the ChatGPT-3.5 response offers a more general title and abstract, allowing for a broader understanding of the topic. Another difference is observed in the content sections. The ChatGPT-4 response suggests a more detailed structure, incorporating sub-sections like “Data analysis and interpretation” and “Idea generation and innovation”. On the other hand, the ChatGPT-3.5 response does not specify these sub-sections. The emphasis on human-centered approaches is more pronounced in the ChatGPT-4 response, which highlights the importance of human expertise and critical evaluation under the section titled “Human-centered approaches”. The ChatGPT-3.5 response, however, gives less focus to this aspect. Lastly, the ChatGPT-4 response introduces a section titled “Critical evaluation”, underscoring the significance of critically assessing ChatGPT’s suggestions. This section is absent in the ChatGPT-3.5 response.

In terms of content, both responses address the role of ChatGPT in academic article design and emphasize its benefits. They also provide information on the ethical considerations and limitations associated with using ChatGPT. Both responses underscore the potential ethical concerns and limitations that may arise from its utilization. Despite these similarities and differences, it is evident that the ChatGPT-4 response exhibits a more detailed structure, delving into specific areas of focus. It concentrates on topics such as data analysis, idea generation, and innovation. Conversely, the ChatGPT-3.5 response provides a more general perspective on these subjects. The ChatGPT-4 response places greater emphasis on human-centered approaches and highlights the importance of critical evaluation. The ChatGPT-3.5 response, however, gives less prominence to these aspects. Overall, both responses explore the role of ChatGPT in academic article design, but they diverge in terms of the depth and emphasis placed on specific topics.

The articles were written with a comparative approach to highlight both the positive and negative aspects of the design. However, the structure of ChatGPT-3.5 deviates from the typical format of an academic article. Instead of providing distinct sections, it presents a summary of the negative and positive aspects without explicit headings. Additionally, although in-text citations and references were requested, both responses lack proper citation and reference format. It can be observed that ChatGPT-3.5 utilizes three references in the article; however, unfortunately, none of these references could be located or verified. On the other hand, ChatGPT-4 includes a total of ten references, but only two of them were identifiable and accessible. This raises concerns about the reliability and validity of the references used in both respon-
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4.4. Identification of the literature review

In the fourth prompt, the author asks for a comprehensive literature review to design an article (questions 6 of ChatGPT-3.5 under the heading “Presentation of the general purpose and approach of the article”). The purpose of this prompt is to test how to design a literature review for an article.

In this study design, ChatGPT conducted a literature review on the topic. Prior to conducting the literature review, ChatGPT-3.5 formulated a search strategy and identified relevant keywords. Subsequently, the literature review was conducted, resulting in the inclusion of ten references. Regrettably, none of these sources could be located or verified. On the other hand, ChatGPT-4 presented ten references, out of which nine were successfully verified, while one remained unverifiable. The findings of this investigation suggest that ChatGPT-4 demonstrates greater reliability and validity in terms of its literature review compared to ChatGPT-3.5. However, concerns arise due to the limited availability of literature sources in ChatGPT-4 and the inability to verify all the recommended references. Consequently, the evaluation of the accuracy and credibility of the information presented in the literature becomes a challenging task.

4.5. Creating writing assistance

In the fifth prompt, the author is asking for writing assistance from ChatGPT to design an article, stating his purpose and target audience (questions 7 of ChatGPT-3.5 under the heading “Presentation of the general purpose and approach of the article”).

Figure 6. Writing assistance text generated by ChatGPT-3.5 and ChatGPT-4

Certainly I can provide writing assistance for your academic article on the future of academic article design with the integration of ChatGPT and other machine learning technologies. Here’s an outline to help you structure your article and explore various scenarios:

1. Introduction
   Introduce the topic of the future of academic article design in the context of the integration of ChatGPT and other machine learning technologies. Explain the significance of this topic and its relevance to academics.

2. Objective of the State of the Literature Review
   Provide an overview of the current practices and challenges in academic article design.

3. Scenario 1: Enhanced Efficiency and Productivity
   Describe a scenario where the integration of ChatGPT and other machine learning technologies streamlines the article design process.

4. Scenario 2: Improved Cost Management and Creativity
   Present a scenario where ChatGPT and other machine learning technologies act as creative collaborators.

5. Scenario 3: Personalized Writing Assistance
   Present a scenario where machine learning technologies provide personalized writing assistance tailored to individual researchers’ needs.

6. Scenario 4: Ethical Considerations and Responsible Integration
   Explore a scenario that addresses the ethical implications of integrating ChatGPT and machine learning technologies in academic article design.

7. Scenario 5: Ethical Considerations on AI and Plagiarism
   Discuss the importance of ensuring transparency, avoiding biases, maintaining authorship integrity, and addressing concerns related to intellectual property and plagiarism.

8. Conclusion
   Summarize the scenarios discussed and their implications for the future of academic article design.

Reflect on the potential benefits and challenges associated with the integration of ChatGPT and machine learning technologies.

Encourage further research, collaboration, and thoughtful exploration of the evolving role of AI in academic writing.

Remember to support your scenarios with relevant examples, scholarly references, and empirical evidence. Additionally, maintain a balance between the potential positive outcomes and the challenges that need to be addressed to ensure the responsible integration of ChatGPT and other machine learning technologies in academic article design.
the article). The purpose of this prompt is to test whether ChatGPT can design the article in accordance with the purpose and audience of the topic.

In this design, ChatGPT-3.5 and ChatGPT-4 both commence the article with an introductory section, where they elucidate the role played by ChatGPT and other machine learning technologies in the realm of academic article design. The two versions propose distinct scenarios within the article. While ChatGPT-3.5 does not designate these scenarios as a discrete section, ChatGPT-4 presents them under separate headings. ChatGPT-3.5 offers a simplified presentation of the article’s title, whereas ChatGPT-4 puts forth a more precise formulation. ChatGPT-4 incorporates a dedicated section titled “Current landscape of academic article design” which delves into the existing practices in this field. In contrast, ChatGPT-3.5 does not propose such a section. The delineation of scenarios as a separate section is not explicitly specified in ChatGPT-3.5, whereas ChatGPT-4 presents each scenario under distinct headings. ChatGPT-3.5 provides a concise summary of the article, while ChatGPT-4 furnishes a more detailed summary that encapsulates the overarching purpose and content of the article.

Both ChatGPT-3.5 and ChatGPT-4 explore the future of academic article design by integrating ChatGPT and other machine learning technologies. They exemplify the impact of these technologies on academic article design through the presentation of diverse scenarios. Furthermore, both versions emphasize the importance of ethical considerations and responsibilities within the realm of academic article design. ChatGPT-4 introduces a more intricate structural framework for the article, incorporating a section titled “Current landscape of academic article design,” which provides a comprehensive analysis of the existing practices in this field. ChatGPT-4 presents the scenarios in a more precise manner, offering detailed explanations of the potential implications of ChatGPT and other machine learning technologies on the design of academic articles. Conversely, ChatGPT-3.5 adopts a more general perspective and accords less emphasis to the specifics of the scenarios. ChatGPT-4 advocates for a section dedicated to evaluating the impact of the scenarios, wherein the potential applications of ChatGPT and other machine learning technologies

Figure 7. Editing and proofreading text generated by ChatGPT-3.5 and ChatGPT-4
contributions, advantages, and disadvantages of each scenario on academic article design are discussed. ChatGPT-3.5 does not include such a section. ChatGPT-4 concludes the article with a summary of the scenarios, wherein the key points and general conclusions of each scenario are highlighted. ChatGPT-3.5 does not incorporate such a summary section. In light of this comparison, it is evident that ChatGPT-4 offers a more intricate structure and presents scenarios in a more specific manner. Conversely, ChatGPT-3.5 adopts a broader perspective and allocates less focus to the details of the scenarios. Both versions explore the integration of ChatGPT and other machine learning technologies in the context of academic article design, although they differ in their treatment of specific subjects and the level of analysis they offer.

4.6. Editing and proofreading

In the sixth prompt, the author asks to edit and proofread an article (questions 1 of ChatGPT-3.5 under the heading “Presentation of the general purpose and approach of the article”) created by ChatGPT. The purpose of this prompt is to test how ChatGPT will edit and proofread an article written by ChatGPT itself. The article has not been rewritten; you can find the article above.

ChatGPT-3.5 has made changes to the text to improve its comprehensibility. However, these changes primarily focus on basic corrections such as improving sentence structures and correcting grammatical errors. In ChatGPT-4, the text was meticulously revised and corrected. In this editing process, more attention was paid to sentence patterns, grammatical errors, and spelling. The text has been revised to ensure greater academic rigor and adherence to academic norms. This comparison reveals that the ChatGPT-4 shows higher potential and achievement in proofreading. ChatGPT-4 has further improved its adherence to academic norms and increased its comprehensibility by organizing the text more comprehensively. The use of language was made sharper and more effective, resulting in a text more suitable for an academic paper.

As a result of ChatGPT-4’s extensive revisions, which bring the text in line with academic norms and improve comprehensibility, the potential and success of editing becomes more evident. ChatGPT-4 provides precise and concise changes that ChatGPT-3.5 does not, while ChatGPT-3.5 makes general revisions to improve comprehensibility.

5. Discussion

In this article, the potential of ChatGPT in academic article design has been explored. The study aims to investigate the capabilities, limitations, and overall suitability of both ChatGPT-3.5 and ChatGPT-4 in the context of academic article design. The overall aim of the paper is to provide suggestions for the use of language models such as ChatGPT in academic paper design and to discuss the effects of non-human-centered design approaches on academic writing processes. The results of this study will provide a basis for future research by discussing the potential benefits and limitations of using AI technologies and non-human-centered design approaches.

The article design process involves conversations between ChatGPT-3.5 and ChatGPT-4 and the author through a series of chat interfaces. The author asks questions and proposes ideas, while ChatGPT-3.5 and ChatGPT-4 provide feedback and suggestions and generate text based on the input. The methods of the study involve providing guiding questions to ChatGPT for writing articles and analyzing ChatGPT’s responses. The responses produced by ChatGPT during the research process were evaluated in detail by another expert academic. This expert has assessed the text generated by ChatGPT in terms of accuracy, consistency, and adherence to academic standards. At the end of the evaluation process, an agreement was reached with the author, thus eliminating the need for any revisions or final approval.

ChatGPT has demonstrated itself to be a reasonably competent conversational AI that can support the design process of academic papers in various ways. ChatGPT-3.5 and ChatGPT-4 exhibits the following capabilities in assisting with academic article design: 1) aiding in the design process, 2) generating ideas aligned with the overall purpose and focus of the paper, 3) producing consistent and contextually relevant responses to various natural language inputs, 4) partially assisting in literature reviews, 5) supporting paper design in terms of both content and format, and 6) providing reasonable editing and proofreading for articles. On the other hand, ChatGPT-4, in addition to the capabilities of ChatGPT-3.5, has shown potential as a valuable tool in the areas of critical evaluation and drafting and refining.

When evaluating the article design capabilities of ChatGPT, it was observed that both ChatGPT-3.5 and ChatGPT-4 demonstrated the ability to produce scholarly articles using a common format. The article design approach employed by ChatGPT-3.5 exhibited a more generalized nature, while ChatGPT-4 demonstrated a more focused approach. By offering the article writer guiding questions and advice on which ones to choose that are the most pertinent and interesting, the answer of ChatGPT-3.5 uses an inquiry-based approach. The response from ChatGPT-4, on the other hand, provides a more detailed outline by suggesting a structure and heading for the piece. ChatGPT-4 highlights specific subjects and offers recommendations. It also contains a distinct part on critical evaluation, which is absent from ChatGPT-3.5. Although the responses for the ChatGPT-3.5 and ChatGPT-4 cover the same ground, there are differences in their structure and concentration. While evaluating ChatGPT’s writing assistance capability to design the article in accordance with the purpose and target audience of the topic, it was observed that both versions suggested different scenarios within the article. While ChatGPT-3.5 does not designate these scenarios as separate sections, ChatGPT-4 presents them under distinct headings. ChatGPT-3.5, while providing writing assistance, possesses a broader perspective and focuses less on the details of the scenarios. In contrast, ChatGPT-4 presents a more detailed structure and addresses the scenarios in a more specific manner. They exhibit differences in their approach to specific topics and the level of analysis they provide. When ChatGPT’s ability
to edit and proofread an article was evaluated, it was observed that ChatGPT-3.5 made general revisions to improve comprehensibility, while ChatGPT-4 provided precise and concise changes that ChatGPT-3.5 did not. ChatGPT-4 made the text more in line with academic norms and increased comprehensibility. During editing and proofreading, ChatGPT-4 corrected spelling and punctuation errors, chose more appropriate verbs, provided clarity and context to statements, highlighted important points, gave details, and even added sentences to emphasize the importance of the topic.

The traditional structure of an academic article typically includes sections such as abstract, introduction, literature review, methods, findings, discussion, and conclusion. ChatGPT places emphasis on the creation of abstracts, introductions, and literature reviews, effectively guiding the article design process. By providing headings that can be utilized in an article and offering guidance on the content to be included under each heading, ChatGPT successfully facilitates the design of academic articles. Furthermore, in the methodology section, ChatGPT suggests relevant methods that are applicable to the given topic.

ChatGPT is deeply changing the design practice. The advantages of using ChatGPT in the academic article design process include increased efficiency, improved organization, and the ability to produce content quickly. With the use of ChatGPT, a consistent draft for the article was created quickly, the language and structure of each section were improved, and even some of the content was generated by ChatGPT itself. As many authors have claimed, ChatGPT has demonstrated potential to provide new discoveries and insights for academic article design. It has significantly reduced energy and time waste by creating article designs similar to those produced by humans (Aljanabi et al., 2023; Alshater, 2022; Aydin; Karaarslan, 2022; Castillo-Gonzalez, 2022; Curtis, ChatGPT, 2023; Gilat; Cole, 2023; Golan et al., 2023; Huang; Tan, 2023; Hutson, 2022; Lin, 2023; Nguyen, 2023; O’Connor; ChatGPT, 2022; Rudolph; Tan; 2023; Tüñeş-López; Fierrez-Ceide; Vaz-Álvarez, 2021). Studies conducted by Aljanabi et al. (2023), Hammad (2023), and O’Connor and ChatGPT (2022) have shown that ChatGPT can understand the objectives behind a problem and provide users with the information they need more quickly and effectively. However, technology limitations were also evident, especially in maintaining consistency and ensuring the accuracy of the generated text.

ChatGPT is capable of quickly and efficiently generating articles, but it lacks the ability to create accurate and complete citations and references. In this study, the inclusion of proper in-text citations and references was explicitly requested; however, neither response successfully met this requirement. For the in-text citations, no sources were provided in either response. Moreover, ChatGPT-3.5 referenced three sources in the paper, but upon further investigation, it was discovered that none of these sources could be located or verified. As for ChatGPT-4, although it included a total of 10 references, only two of them were identifiable and accessible. Consequently, the credibility and reliability of the sources mentioned in both responses are questionable. Furthermore, since the citations and sources are not clearly indicated, there is a risk of plagiarism and academic misconduct, as expressed by some authors (Alkaissi, 2019; Dutton, 2023; Huang; Tan, 2023; Işkender, 2023; Nguyen, 2023). In addition, there are concerns that ChatGPT may not represent the moral, social, and cultural ideals that academics value (OpenAI, 2022). When considered in the context of commercialization purpose (Huang; Tan, 2023), it should not be overlooked that ChatGPT is not conscious and lacks self-awareness (Pavlik, 2023).

On the other hand, ChatGPT has shown various limitations in understanding some issues and requests, as well as in creating or completing citations and literature reviews. Although ChatGPT can create designs and texts suitable for an academic article, it has many shortcomings when looking at the article examples it has written. At this point, there is also a concern that it may lead to a lack of critical thinking, originality and analysis and provide biased information (Bishop, 2023; Dutton, 2023; Huang; Tan, 2023; İskender, 2023; Nguyen, 2023). In addition, there are concerns that ChatGPT may not represent the moral, social and cultural ideals that academics value (OpenAI, 2022). When considered in the context of commercialization purpose (Huang; Tan, 2023), it should not be overlooked that ChatGPT is not conscious and lacks self-awareness (Pavlik, 2023).

Nori et al. (2023) have previously emphasized the importance of studying the progress and capabilities of these two ChatGPT models when the expected launch of GPT-4 takes place. The main difference between ChatGPT-3.5 and ChatGPT-4 is that ChatGPT-4 allows users to send up to 25,000 words, an eightfold increase from the number allowed by ChatGPT. In addition, OpenAI claims that their latest technology produces fewer errors, so-called “hallucinations”. In the past, ChatGPT could disappear, give nonsensical answers to your query, or even send stereotypical or incorrect information. In addition, ChatGPT-4 is more capable of expressing creativity and manipulating language (Hughes, 2023; OpenAI, 2023). A study conducted by Rahaman et al. (2023) shows that ChatGPT-4 is significantly more successful than ChatGPT-3.5 at translating languages, answering questions, and understanding human emotions. The study emphasizes that ChatGPT-4 outperforms its previous version in every respect. Another study by Metz and Collins (2023) shows that ChatGPT-4 successfully passed the bar exam and various standardized tests by summarizing and interpreting both visuals and texts. They also observed a significant increase in accuracy compared to ChatGPT-3.5. ChatGPT-4 is 40% more likely to produce real answers than ChatGPT-3.5 (OpenAI, 2023). On the other hand, Chen, Zaharia and Zou (2023) evaluated the March 2023 and June 2023 versions of GPT-3.5 and GPT-4 on four different tasks: solving math problems, answering sensitive/dangerous questions, generating code, and visual reasoning. They found that the performance and behavior of both models could change significantly over time. For example, GPT-4 was excellent at identifying prime numbers in...
March 2023 (accuracy 97.6%) but performed poorly on the same questions in June 2023 (accuracy 2.4%). Interestingly, GPT-3.5 performed much better on this task in June 2023 compared to March 2023.

A study conducted by Cao (2023) focused on the ability of ChatGPT-4 to cite scientific articles. This study found a significant inconsistency in the performance of ChatGPT-4 across different fields. This trend highlights a significant limitation in the functionality of ChatGPT-4’s scientific reference citation and indicates a need for improvements in specificity and validity. The same research found that when queried about topics requiring expertise, ChatGPT-4 tends to prioritize more general topics. This situation, especially when it comes to academic research requiring expertise, necessitates continuous human intervention and verification process to ensure the applicability of the model’s outputs (Huang; Tan, 2023; Zhang; Gosline, 2022). Another study by AlAfnan and Mohdzuki (2023) indicates that ChatGPT-4 uses declarative, imperative, and interrogative modes. The declarative mood is typical in academic writing responses, while the imperative mood is typical in responses related to case studies.

6. Conclusion

In this study, it is possible to observe how much and how ChatGPT-3.5 and ChatGPT-4 intervened in the design of an academic article based on their suggestions. This research is in line with the goal of exploring the role of ChatGPT in academic article design in terms of human-machine collaboration.

The use of ChatGPT in academic article design represents a step towards non-human-centered design in the academic world. Although there are limitations to the technology, it also offers many opportunities to increase efficiency and creativity in the research process. As artificial intelligence technology continues to develop, it is important to carefully evaluate the potential benefits and drawbacks of using non-human-centered design methods in academic research. Despite the shortcomings of both, ChatGPT-3.5 to some extent, and ChatGPT-4 more broadly, have the potential to logically and appropriately specify the steps to follow in the design of an academic article. In the study, it was determined that both ChatGPT-3.5 and ChatGPT-4 can serve as a valuable tool in academic article design. Therefore, as noted by Farias (2023), ChatGPT has demonstrated considerable functionality as a tool that can be used in the preparation of academic/scientific texts. However, while ChatGPT offers advantages such as accelerated writing, enhanced productivity, and comprehensive responses, it also brings potential disadvantages including a decrease in critical thinking, concerns about plagiarism, misinformation, and a lack of originality and innovation. In order to mitigate such disadvantages, it is indispensable to establish precise guidelines for the ethically compliant use of ChatGPT.

Future research should continue to explore the impact of ChatGPT and similar designs on research quality and validity. This way, the role of artificial intelligence technology in academic research can be further explored. Furthermore, future studies could be initiated to compare the results obtained with ChatGPT against other systems, such as Google’s Bard or Microsoft’s Chat Bing. In addition, it may be illuminating to compare the results obtained with ChatGPT with the results obtained with AI research assistants capable of finding sources, citing references, summarizing results, or producing relevant text, such as Elicit, Scite, SciSpace, Research Rabbit, Connected Papers, Perplexity, Paperpal, and Litmaps.

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